California Pepper Commission

531-D North Alta Ave ~ Dinuba, CA 93618, Phone (559) 591-3925 Fax (559) 591-5744

-2019-

Chairman, California Pepper Commission
Glen Fischer, Saticoy Foods

The California Pepper Commission focuses its efforts on improving the chemical, disease and pest issues that concern the pepper industry. The Commission met earlier this year with the purpose of discussing any current and future issues along with research projects that can improve the California Pepper industry. Consisting of five producers, five processors and one public representative, these members are nominated by the industry to represent their interests on the Commission.

Our annual newsletter contains summaries of the research projects completed during the 2017-18 year. Each of these projects was considered by the Commission's Research Committee and then recommended to the Commission for approval. Most of our projects have been ongoing, focusing on the more practical issues of farming peppers, while some focus on more basic research that the Commission feels deserves attention. You can view these research reports plus more on the Pepper Commissions website www.calpeppers.com.

Every five years the California Department of Food and Agriculture must hold a referendum to determine if the industry would like to continue the Pepper Commission. Following the referendum, CDFA determined that the Pepper Commission would continue for another five years.

Every three years the Commission holds a series of nomination meetings to allow interested producers an opportunity to serve a three year term. The processors/handlers are chosen by a recommendation from within the industry. The Commission held its latest nomination meetings earlier this year setting the roster for the term 2019-22. Glen Fischer of Saticoy Foods remains as Chairman with producer Mike Chuck serving as Vice Chairman and Bob Heisey of United Genetics remains as the Research Committee Chairman.

The Commission worked with Valent and the Department of Pesticide Regulation on obtaining a Special Local Need (SLN) 24C on Chateau. Chateau is available to growers for a pre-transplanting application for weed control on mallow in the furrow bed. The Label can be found on the Valent website www.valent.com. Dual Magnum continues to be available as a 24C label from Syngenta through their website www.farmassist.com. Without the assistance of the Pepper Commission herbicides such as Chateau and Dual Magnum as well as the registered fungicide Rally would not be available to the industry.

You can also find a pepper-related pesticide list, which is provided to the industry by the California League of Food Processors at their website www.clfp.com. You can sign in to view this list on the Pesticide Program page with the ID: **nathan@tabcomp.com** and password **nathan93618**.

For the past several years the Commission has been a member and active participant with the California Specialty Crops Council (CSCC). The CSCC provides the Commission the opportunity to work with similar groups to focus on research, education, and regulatory activities, which may affect California agriculture. By representing a variety of groups, the CSCC is well supported when communicating industry issues with state and federal agencies. The CSCC also acts as a conduit of information between its members and various entities. For more information you can visit the CSCC website at www.specialtycrops.org.

A new relationship has the Commission contributing to the Alliance for Food and Farming www.foodandfarming.info to help support the safe fruits and veggies message of "eat more produce." Using science based data safe fruits and veggies are educating the consumer on how conventional produce is just as safe as organic and how we should be consuming more. Consumers can visit the site www.safefruitsandveggies.com.

Among Commission activities, the agricultural sustainability strategic plan, research reports and this newsletter can be found on the website www.calpeppers.com. You will also find links to the SLN Labels for Chateau and dual magnum along with a link to the CLFP site.

While the Commission has traditionally focused its attention on agronomic research, labor has become a growing concern for the industry. The Commission has taken an interest in pursuing mechanical harvesting type projects as well as research that looks at different ways to easily remove the fruit from the plant. The future of breeding research will also need to consider the removal of the fruit by way of mechanical harvesting as this idea progresses.

Insect Pest Management on Peppers
John T. Trumble, and Greg Kund, UC Riverside

Pepper field trials were conducted at the University of California Riverside Agricultural Operations. The project included both a chemical screening trial and an IPM trial component. The chemical screening and IPM trials were structured to identify new compounds that can potentially be used in a commercial IPM program. The IPM program was conducted using a large-scale commercial field design and was used to evaluate treatment rotations against a complex group of insects for efficacy.

Chemical trials examined rotations of Radiant SC, Spear-T LC, Sequoia 2 SC, Bioprotec *Bt*, Venerate XC, and Asana XL. All of these materials were applied on a weekly basis.

The IPM trials examined two rotational treatments and a chemical standard. The first IPM treatment consisted of a rotation of Intrepid+ Sequoia 2 SC, Radiant SC, and Vydate L. The other organic IPM treatment was comprised of Pyganic 1.4 EC, Trilogy EC, Mycotrol O, and Entrust SC. A chemical standard treatment was Asana XL. The materials used in the IPM trial were applied according to rotational strategies that would support a commercial grower operation. The first IPM treatment had each treatment applied two times in a rotation. The second IPM program had applications of Pyganic combined with Trilogy and Mycotrol combined with Entrust for a total of six applications. The chemical standard of Asana was applied six times. The fruit from the chemical and IPM trials were harvested and assessed for insect damage. The assessment included, damage from worms, pepper weevils, stink bugs, aphids, and potato psyllids.

Worm populations were low to moderate this field season. Most treatments for worm control performed well and were significantly better than the untreated control. Pepper weevil numbers were low this season due to hot weather conditions. We did see differences between the treatments for psyllid (*Bactericera cockerelli*) and aphid numbers, and the Asana XL product had the highest counts for both insects. For a complete copy of the report contact the California Pepper Commission.

Laboratory studies tested two different populations of *Bactericera cockerelli* pepper psyllid nymphs exposed to five rates of Exirel™ to determine their level of susceptibility. The collection locations of the populations were at the UCR Agricultural Operations pepper field in Riverside, CA, and at a pepper field in Fillmore, CA. The results indicate that the "Fillmore, CA" population was very susceptible to Exirel™, and the psyllid population from "Riverside, CA" showed more signs of resistance. However, the rates that were used in these tests were well below any recommended field application rate.

We investigated the environmental impacts of contaminants of emerging concern (CECs) on the green peach aphid (*Myzus persicae)* and pepper plants (*Capsicum annuum).* The CECs are present in reclaimed wastewater that is used to irrigate crops. Lab experiments examined common pharmaceuticals found in reclaimed wastewater and their effects on green peach aphids, as well as the development of bell pepper plants. The results showed no effect on green peach aphid populations, but there were significant differences in plant root mass development, which could indicate the CECs could hinder or delay crop production. Complete results can be found in the following publication:

Pennington, M. J., J. A. Rothman, M. B. Jones, Q. S. McFrederick, J. Gan, and J. T. Trumble. 2018. Effects of contaminants of emerging concern on Myzus persicae (Sulzer, Hemiptera: Aphididae) biology and on their host plant, Capsicum annuum. Environmental Monitoring and Assessment 190:125 (11 pages): https://doi.org/10.1007/s10661-018-6503-z

A Resistance-breaking Strain of Tomato Spotted Wilt Virus (TSWV) of Pepper in the Central Valley of California: Survey, Screening for Resistance and Genetic Variability

Robert L. Gilbertson, UC Davis

In 2017, we detected a resistance-breaking (RB) strain/variant of *Tomato spotted wilt virus* (TSWV) from fruit of a resistant (*Tsw* gene) variety in California (Yolo Co.) for the first time (referred to as RB-TSWV-CA-P-1). In 2018, samples of resistant cultivars with symptoms revealed RB-TSWV strains/variants from three additional counties: Fresno, Santa Clara and San Joaquin. RB-TSWV was also recovered from samples from the same field in Yolo County that it was recovered from in 2017, indicating overwintering capacity. In 2018, spotted wilt symptoms in resistant cultivars were mostly observed late in the season on fruits, and did not cause substantial loss. Greenhouse experiments revealed that RB-TSWV-CA-P-1 infected and caused spotted wilt symptoms in all six resistant cultivars tested, and was very aggressive in pepper compared with other TSWV isolates. Thus, RB-TSWV-CA-P-1 is a bona fide pepper RB strain with the capacity to infect major resistant cultivars grown in California. The viral NSs sequences of wild-type TSWV and RB-TSWV-CA-P-1 from Yolo County were closely related (99% identity), but phylogenetic analyses revealed these are distinct strains/variants and are placed in a larger group of California TSWV isolates. Thus, the pepper RB-TSWV in California appears to have evolved locally and this is likely occurring in other production regions in the state.

Efficacy of Novel Nematicides and Plant Resistance Against Root-Knot Nematodes on Bell Peppers

Antoon Ploeg, UC Riverside

Identical field trials were done on root-knot nematode (*M. incognita*) infested field sites at two locations: CVARS (Coachella Valley Agricultural Research Station) and SCREC (SouthCoast Research and Experiment Station, Irvine).

Each site had 70 plots. Plots consisted of 20 ft long sections of 60-inch-wide (CVARS) or 40-inch-wide (SCREC) sections of beds. There were seven treatments:

1) Untreated control

2) Metam-sodium @ 75 gallon/acre, drench incorporated, 3 wk pre-plant
3) Salibro @ 30.7 oz/acre drench incorporated, 1 wk pre-plant
4) Salibro @ 46.2 oz/acre drench incorporated, 1 wk pre-plant
5) Salibro @ 61.4.7 oz/acre drench incorporated, 1 wk pre-plant
6) Nimitz @ 5 pt/acre drench incorporated, 1 wk pre-plant
7) Velum One @ 13 oz/acre drench incorporated, 1 wk pre-plant

Field was designed according to a completely randomized block split-plot design with 5 replicates. Main treatments were nematicide treatments, sub-treatments were pepper variety: susceptible pepper 'Baron' and resistant 'Carolina Wonder'. Transplants of were grown in a UCR greenhouse and planted in the plots on 3/16/2018 (CVARS) and 6/19/2018 (SCREC). Plants were planted in one line per bed per bed , at 16 inch spacing, with resistant and susceptible varieties in adjacent beds for each nematicide treatment. Watering and fertigation was through buried drip.

Data collected were pre-treatment soil root-knot nematode levels, galling of pepper root systems at harvest, fruit yield at harvest, and nematode infestation levels of the roots.

Results

CVARS: Pre-treatment root-knot nematode levels (J2/100 g soil) were low 8(J2/100 g) and not significantly different between the treatments. At-harvest soil nematode levels were not different between the nematicide treatments, but were very much affected by the pepper variety. Under the susceptible 'Baron', soil nematode numbers were 3,010 J2/100 g soil, whereas after the resistant 'Carolina Wonder' only 1 J2/100g soil was detected. The pepper variety had similar dramatic effects on the number of nematode eggs per root system, and on root galling. Of the nematicides, all three Salibro treatments reduced galling compared to the untreated control in the susceptible peppers.

SCREC: At the SCREC station, pre-treatment root-knot nematode levels were moderate (40 J2/100 g) and not significantly different between the treatments. At-harvest soil nematode levels were not different between the nematicide treatments, but like at CVARS, were affected by the pepper variety. Under the susceptible 'Baron', soil nematode numbers were 869 J2/100 g soil, whereas after the resistant 'Carolina Wonder' this was 106 J2/100g soil was detected. At SCREC, the pepper variety also affected the number of nematode eggs per root system, and root galling. There were no significant effects of the nematicides.

At SCREC, where initial nematode levels were higher than at CVARS, the resistant peppers yielded significantly more than the susceptible peppers. In the susceptible peppers, the untreated control treatment had the lowest yield, but differences were not significant at the 95% confidence level.

Conclusion

The initial hypothesis that the infestation of resistant peppers at CVARS in 2017 could have been due to high soil temperatures, or the presence of a resistance-breaking nematode population could not be confirmed in greenhouse pot trials. Also, in our 2018 trials, the resistant peppers remained virtually free of nematode (symptoms) at CVARS, or had very low nematode infestation levels (SCREC). There were some indications that the nematicide Salibro may have some benefit as it significantly reduced root-galling in the susceptible variety, and also resulted in the lowest at-harvest nematode levels at CVARS. At SCREC, where nematode pressure was moderately high, the resistant variety 'Carolina Wonder' yielded significantly more than the susceptible 'Baron'. We will continue to explore the potential of nematode resistance in pepper. Basic knowledge about the relationship between initial nematode levels and crop yield is important for deciding on the use of nematode control strategies. Such data are not available for root-knot nematode and pepper in California.

Efficacy of Protone (abscisic acid) as an Aid to Lowering Detachement Force for Bell Peppers

Bob Heisey & Armando Martinez, United Genetics

To determine the rate necessary to elicit a response to the chemical, we drenched 25 ft plots of mature bells with the equivalent of 100, 600, and 1200 gms per acre, using a watering can containing adequate water to drench the surface of the soil around the plants. Watering of the plots continued through the drip system as required.

After 10 days, there was no noticeable effect on the plants, and no change in detachment force. We did a second drench with the same dosages; after 10 days, again no effect.

As a final attempt, we tried rates three times and 10 times the maximum rate of 1200 gm/acre, ie 3600 gm/acre and 12,000 gm/acre. We saw no response even at these high rates.

Full Reports are Available at the Commission Office or website www.calpeppers.com

2019-2020 Research Projects

Thomas Perring	Insect Pest Management	$22,000
Bob Gilbertson	Detection & Monitoring of TSWV	17,000
Antoon Ploeg	Root-knot Nematode Damage	10,124
Brenna Aegerter	Pepper Evaluation for Mechanical	10,500

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2018-19 Financial Report

The accompanying financial report shows the Pepper Commission is not as financial comfortable as previous years. The Commission was unable to reach its projected income of $109,000 at the $0.30 per ton assessment rate. The Commission based its income off 360,000 tons of fresh peppers. With several years of a strong carryover, the Commission was comfortable with setting an expenditure budget which exceeded the projected income knowing the reserve would provide the flexibility of spending.

The Commission's books are audited annually by an independent Certified Public Accountancy firm, and any pepper industry member wanting a copy of said audit may apply to the Commission office.

Fiscal Year: March 1, 2018 through February 28, 2019

Account Name	*Amount*
INCOME	
Assessment Income, 2018-19	$98,811
Assessments Prior	2,933
Interest Income	1,739
Total Income	103,483
Carryover from 2017-18	132,312
Income/Carryover	**$235,795**
EXPENDITURES	
Management Services	$42,240
Audits	2,885
Office Supplies	611
Telephone	519
Postage	500
Reports & Publications	1,028
Subscriptions	2,000
Travel & Mileage	1,320
Meetings	556
Insurance	1,095
Website	1,950
Marketing Branch, CDFA	13,647
Market Enforcement Branch	3,038
California Specialty Crops Council	6,000
Production Research	55,478
Chemical Research	3,038
Total Expenditures	**$135,367**
Cash-Balance 8/31/2019	$100,428

The Commission and staff are always available to answer questions or assist in any way they can. Nathan Sano (nathan@tabcomp.com) is the Board Manager, and Kim Sakamoto (kim@tabcomp.com) is the Assistant Manager, and they can be contacted via email or at 559/591-3925.

Every three years the Commission is required to provide industry members the opportunity to participate in a nomination process to represent their district as a member or alternate to the Commission. The following is the Commission roster for the 2019-22 fiscal years.

California Pepper Commission 2019-22

MEMBERS	**ALTERNATES**
Producer Representatives	
Robert Meyer Arroyo Grande	John Hook King City
William Terry Oxnard	*Vacant*
Mike Chuck Gilroy	Dan Fiorio Gilroy
Ben Migiazzo Le Grand	*Vacant*
Adrian Zendejas Coachella	Patrick Pinkard Helm
Handler Representatives	
Matthew Terra Escalon	*Vacant*
Sam Myers Farmington	Juan Lopez Hanford
Glen A. Fischer Ventura	Mark Hensley Ventura
Yosh Kamine Fresno	Edward Chell Camarillo
Bob Heisey Hollister	Terry Berke Woodland
Public Representative	
Dave Nirenberg Camarillo	*Vacant*
Staff	
Nathan Sano (Manager) Dinuba	Kim Sakamoto (Asst. Manager) Dinuba